

A CONTRIBUTION TO THE STUDY OF ALGERIAN ODONATA

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Abstract

A survey of the dragonflies of Algeria, spanning nine years, has yielded 53 species. Past records of another 10 species are believed to be genuine, making up a total of 63 species for the country. We try to clarify the status of these supplementary species and also provide information on the current distribution and present status of all recorded species.

Introduction

The dragonflies of Algeria have, since the mid-nineteenth Century, attracted much attention (Menaï, 1993). Yet, despite the impressive amount of data gathered by several visiting entomologists, large gaps in our knowledge of the distribution and status of many species remain. Moreover, a number of taxa pose taxonomic challenges. The geographic location of the country, and its size, climate and varied topography, combine to fuel interest in its fauna and flora. Systematic records of dragonflies of Algeria began with Lucas during the « Exploration scientifique de l'Algérie » (Sély-Longchamps, 1849). More papers followed by Sély-Longchamps (1865, 1866, 1871, 1902) and a distinguished array of odonatologists (Kolbe, 1885; McLachlan, 1897; Martin, 1901, 1910; Morton, 1905). The turn of the Century coincided with a renewed interest in Algerian dragonflies, now focused mainly on desert species, following the French penetration of the Sahara (Le Roi, 1915; Kimmins, 1934; Reymond, 1952; Nielsen, 1956; Dumont, 1978). As a result, the Odonata of the Tell (i.e. the northern part of Algeria between the sea and the Saharan Atlas) somewhat fell out of favour and no comprehensive account of the Odonata of Algeria has been attempted since the important synthesis of Le Roi (1915). In an attempt to map the distribution of local dragonflies, we have been conducting a survey of major habitats (Fig. 1) within Algeria since 1990.

Methods

Sampling, which was not standardized, was carried out intensively within northeastern Algeria over a nine-year period while the rest of the Tell received very few visits.

Collecting within the Sahara was carried out through ten odonatological expeditions over a six-year period (1990-1995). Details of the distribution and ecology of Numidian (i.e. El Kala and Guerbes) species are to be found elsewhere (Samraoui, in prep.). Information on habitats sampled can be found in Menaï (1993) and Samraoui & Bélair (1997, 1998). New locality records are designated '(!)' and the recorded flight period is followed by previously known information on adult phenology recorded in Roman numerals. When uncertainty attached to the precise location of a published record, the region or country to which I have tentatively assigned it is followed by '(?)'. In locality designations, the words 'Garaa' (lake/pond) and 'Oued' (wadi) are abbreviated to 'G.' and 'O.' respectively. Specimens are kept in the reference collection of the Laboratoire de Recherche des Zones Humides (University of Annaba).

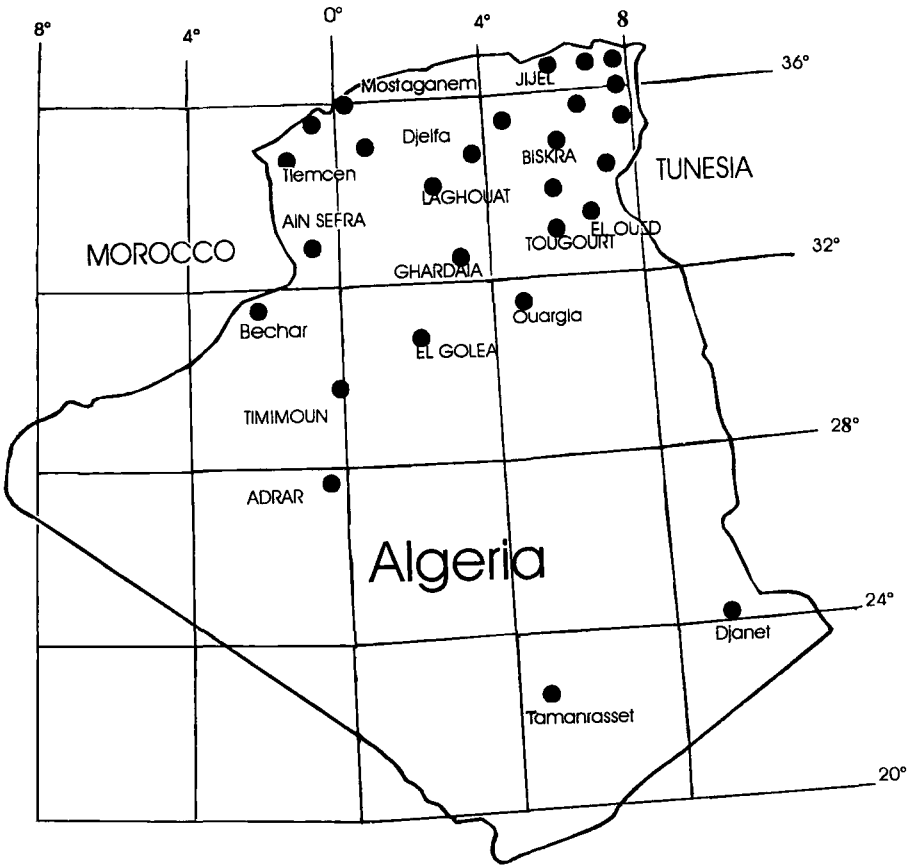


Figure 1. Map of Algeria, showing the main localities mentioned in this paper.

Species recorded during this study

ZYGOPTERA

CALOPTERYGIDAE

Calopteryx haemorrhoidalis haemorrhoidalis (Vander Linden, 1825)

May-October (IV-VII). Abundant and widely distributed in the Tell, it is found up to the edge of the Sahara.

This study: Numidia, Mechroha (!), Collo (!), Jijel (!), Batna, Tlemcen (!), Drea (!).

Previous records: Cercle de la Calle (Sély, 1849), Bône (Sély, 1871), Constantine, Le Tarf, Oubeïra, Biskra (Mc Lachlan, 1897), Biskra (Martin, 1901), Biskra, Laghouat (Sély, 1902), Sebdou (Morton, 1905), Bône, La Calle, El Guerra, Batna (Martin, 1910), Hammam R'hira (Ris, 1913), Mascara (Navás, 1922), Azazga, Mascara (Lacroix, 1925).

LESTIDAE

Lestinae

Lestes barbarus (Fabricius, 1798)

April- November (V-VII). Less common than other species of *Lestes*; confined to the Tell.

This study: Numidia, Tlemcen (!).

Previous records: Alger, Constantine, Bône, La Calle (Sély, 1849), Bône (Sély, 1871), Médéa, Constantine, Lac des Oiseaux, Le Tarf (Mc Lachlan, 1897), Constantine, Philippeville, Fetzara (Martin, 1901), Bône, La Calle (Martin, 1910), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

Lestes virens virens (Charpentier, 1825)

April-August (V-X). Found in the Tell, but more common in the eastern part of Algeria. Reproduces in the summer.

This study: Numidia, Jijel (!), Tlemcen (!).

Previous records: Alger, Constantine, Bône, La Calle (Sély, 1849), Médéa, Constantine, Bône, Lac des Oiseaux, Le Tarf (McLachlan, 1897), Constantine, Philippeville, Fetzara (Martin, 1901), "Province de Constantine" (Martin, 1910), Agoulmine Ouroufal (Lacroix, 1925), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

Lestes cf. virens

May (inferred) - November. Distinguished from *Lestes virens virens* by its colour (copper) when sexually mature and more importantly by its reproductive phenology (Samraoui & Corbet, in prep.). Uncommon in lowlands except during the reproductive period (October).

This study: Numidia (!), Jijel (!).

Previous records: None. McLachlan's (1897) record probably refers to this taxon: "The only example from Constantine is a male in which the green of the body is

replaced by bronzy-black (almost as in *Sympecma*), with a cupreous tinge on the broad infra-humeral area; otherwise normal."

Lestes viridis viridis (Vander Linden, 1885)

April-December (V-XI). Fairly common in the Tell but more so in N.E. Algeria.

This study: Numidia, Jijel (!), Mechroha (!), Collo (!), Batna (!), Tlemcen (!).

Previous records: Tonga, Oubeira (Sélyls, 1849), Bône, La Calle, (Sélyls, 1871), between Blida and Médéa (Kolbe, 1885), Constantine (Mc Lachlan, 1897), Constantine, Fetzara (Martin, 1901), Sebdou (Morton, 1905), Constantine, Bône, Philippeville (Martin, 1910), Tala Kitane (Lacroix, 1925), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

Sympecmatinae

Sympecma fusca (Vander Linden, 1823)

February-October (I, II, V-VI, VIII, X). Found mainly in the Tell, it is locally abundant in N.E. Algeria.

This study: Numidia, Mechroha (!).

Previous records: Tonga (Sélyls, 1849), Bône (Sélyls, 1871), Bône, Constantine, Biskra (McLachlan, 1897), Fetzara, Biskra (Martin, 1901), Téniet el Had, Sebdou (Morton, 1905), La Calle, Bône, Constantine, Biskra (Martin, 1910), Ighzer Temda (Lacroix, 1925), Mascara (Navás, 1928), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

PLATYCNEMIDIDAE

Platycnemis subdilatata Sélyls, 1849

May-October (IV-VII). Fairly common; found in the Tell and the northern fringe of the Sahara.

This study: Numidia, Mechroha (!), Meskiana (!), Tebessa (!), Batna (!), Drea (!), Laghouat, Djelfa (!).

Previous records: Rhummel, Boumerzoug (Sélyls, 1849), between Blida and Médéa (Kolbe, 1885), Constantine, Biskra, O. Bou Sba, Le Tarf, Kef Oum Tboul, Oubeira (McLachlan, 1897), Biskra, Constantine (Martin, 1901), Laghouat, Biskra, Touggourt (Sélyls, 1902), Sebdou (Morton, 1905), Rhummel, Biskra, Touggourt (Martin, 1910), Mascara (Navás, 1922), Alger, O. Kerma, Mascara (Lacroix, 1925), Guerbes (Samraoui & Bélair, 1997).

COENAGRIONIDAE

Coenagrioninae

Cercion lindeni lindeni (Sélyls, 1840)

March- November (V-VII). Abundant and widespread but less so in western Algeria.

This study: Numidia, Mechroha (!), Tebessa (!), Jijel (!), Bou Saada (!), Djelfa (!), Laghouat (!).

Previous records: Alger, Constantine, Bône, La Calle (Sélyls, 1849), Bône, Edough

(Sélys, 1871), Le Tarf, Lac des Oiseaux, O. Bou Sba (McLachlan, 1897), Fetzara (Martin, 1901), Fetzara, Oubeira, Tonga, Constantine, Bône, Philippeville (Martin, 1910), Fetzara (Ris, 1913), Alger, Mascara (Lacroix, 1925), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

Coenagrion caerulescens (Fonscolombe, 1838)

June-August (VI). Our survey has added new localities, all located in the semi-arid zone and the northern fringe of the desert to which this species is confined.

This study: Meskiana (!), Tebessa (!), Batna (!), Drea (!), Bou Saada (!), Biskra (!), Sidi Okba (!).

Previous records: Sebdou (Morton, 1905), Mascara (Navás, 1922; Lacroix, 1925).

Coenagrion mercuriale (Charpentier, 1840)

May-August (VI). Uncommon; it reproduces in fairly fast streams but is not restricted to high-altitude sites as was found in Tunisia (Dumont, 1977).

This study: Numidia, Drea (!), Tlemcen (!).

Previous records: Lambessa (Sélys, 1871), Sebdou (Morton, 1905), La Seybouse, Bône (Martin, 1910).

Coenagrion puella kocheri Schmidt, 1960

March-June (V). Uncommon; confined to Numidia where it reproduces in streams.

This study: Numidia.

Previous records: Philippeville (Martin, 1910).

Coenagrion scitulum (Rambur, 1842)

April- July (V-VIII). Fairly common but mostly restricted to N.E. Algeria.

This study: Numidia, Jijel (!).

Previous records: La Calle (Sélys, 1849), Constantine (Martin, 1901), Laghouat, Aïn Rich (Sélys, 1902), La Calle, Seybouse (Martin, 1910), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

Erythromma viridulum (Charpentier, 1840)

May-October. Locally abundant within Numidia.

This study: Numidia, Tebessa (!).

Previous records: La Seybouse (Martin, 1910), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

Ischnurinae

Enallagma deserti Sélys, 1871

April- August (VII-VIII). Fairly abundant across the semi-arid zone; rare and located to a few sites within Numidia. The *Enallagma* complex is made up of *E. deserti* and *E. cyathigerum* (McLachlan, 1897; Lohmann, 1990), and the newly recorded Numidian population is a darker form similar to the Moroccan submountain form (Lieftinck, 1966). Clearly, the “*E. deserti* problem” (Lieftinck, 1966) deserves closer study.

This study: Numidia, Tebessa (!), Batna, Sidi Bel Abbes (!), Tlemcen (!).

Previous records: Lambessa (Séllys, 1871), Lac des Oiseaux (Samraoui et al., 1992).

***Ischnura graellsii* (Rambur, 1842)**

February-November (V-VII). Abundant and widespread in the Tell. Past southern (south of the Saharan Atlas) records concern either *I. saharensis* or *I. fountaineae*. In contrast to what has been found in Morocco (Jacquemin, 1991), there does not seem to be much overlap between Algerian populations of *I. graellsii* and *I. saharensis*.

This study: Numidia, Mechroha, Meskiana (!), Collo, Jijel, Tebessa, Bou Saada (!), Batna, Mostaganem (!), Sidi Bel Abbes (!), Drea (!), Djelfa (!).

Previous records: Bône, La Calle (Séllys, 1849), Bône (Séllys, 1871), “generally distributed” (McLachlan, 1897), Biskra, Constantine, Philippeville, Fetzara (Martin, 1901), Biskra, Touggourt, Temacin, Laghouat, Aïn Rich (Séllys, 1902), Sebdou (Morton, 1905), “Département de Constantine jusqu’à Touggourt “ (Martin, 1910). Beni Abbes, Guelta de la Saoura, Zeramra, Bou Ali, Sali, Reggan, Aïn Tinguelguemine (Reymond, 1952), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

***Ischnura fountaineae* Morton, 1905**

March-September (IV,VI). Abundant and widespread in the northeastern fringe of the Algerian Sahara (along the western edge of the Grand Erg Oriental). It is fairly rare elsewhere in the Sahara and it is apparently absent from Central Sahara. We have recorded it in numerous localities, in sympatry with *I. saharensis*, while in the semi-arid zone, on rare occasions, individuals can be found in company of *I. graellsii*. The same distribution pattern was discovered in Tunisia (Dumont, 1977).

This study: Negrine (!), Biskra; Sidi Okba (!); El Oued (!), Djamaa (!), Touggourt, Temacin, Ouargla (!), Ghardaïa (El Golea (!); Oran (!), Béchar (!), Aïn Sefra (!).

Previous records: Biskra (Morton, 1905), El Guerra (Martin, 1901), Temacin, Touggourt (Le Roi, 1915), Fetzana, Hassi Maroket (Dumont, 1978).

***Ischnura pumilio* (Charpentier, 1825)**

August-October (V-VI). Very rare in Numidia but may be more frequent further south.

This study: Numidia, Tebessa (!).

Previous records: Alger, La Calle (Séllys, 1849), Tala Kitane (Lacroix, 1925).

***Ischnura saharensis* (Aguesse, 1958)**

March-October (II-VI). Confined to the Sahara, this species is abundant and widespread except along the O. Rhir axis (Ouargla-Djamaa) where *I. fountaineae* is dominant.

This study: El Oued (!), Biskra, Sidi Okba (!); Djamaa (!); Temacin (!); Laghouat, Ghardaïa, El Golea, Aïn Sefra, Ahaggar.

Previous records: Beni Abbes, Zerhamra (Nielsen, 1956; Aguesse, 1958), Taghit, Tamanrasset, Bechar (Aguesse, 1958), Fetzana, In Salah, Tagmoute, G. Affilal, G. Issakrasène, G. Idjif Mellène, G. Emeghra, Igharghar, Temekerest (Dumont, 1978), Beni Abbes (Koch, 1979).

Nehalenninae

Ceriagrion tenellum nielsenii Schmidt, 1953

April-October. Fairly common but more so in Numidia. It is generally associated with peat bogs, shady streams and wet forests.

This study: Numidia, Tebessa (!), Tlemcen (!).

Previous records: La Calle (Sélys, 1849), Aïn Kriar, Kef Oum Tboul (McLachlan, 1897), Sebdou (Morton, 1905), El Guerra, La Seybouse, Bône, Batna (Martin, 1910), Tala Kitane (Lacroix, 1925), Guerbes (Samraoui & Bélair, 1997).

ANISOPTERA

AESHNIDAE

Aeshninae

Aeshna affinis Vander Linden, 1820

May-August. Locally abundant but mostly restricted to N.E. Algeria.

This study: Numidia, Jijel (!).

Previous records: Alger, Constantine, Bône, La Calle (Sélys, 1849), Edough (Sélys, 1871), Aïn Kriar, La Calle (McLachlan, 1897), Kabylie (Lacroix, 1925), Guerbes (Samraoui & Bélair, 1997).

Aeshna cyanea (Müller, 1764)

August-October. Locally abundant but confined to high altitude streams.

This study: Numidia.

Previous records: Edough (Sélys, 1871), Azazga (McLachlan, 1897), Bône (Martin, 1910), Ighzer Temda (Lacroix, 1925).

Aeshna mixta Latreille, 1805

May-December (VI-VIII). Fairly abundant and widespread though not recorded in western Algeria.

This study: Numidia, Collo (!), Jijel (!).

Previous records: Alger, La Calle (Sélys, 1849), Bône, Edough (Sélys, 1871), Teniet el Had (Morton, 1905), Bône (Martin, 1910), Kabylie (Lacroix, 1925), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

Anaciaeshna isosceles (Müller, 1767)

April-July (VI). Fairly abundant in only a few sites, located in the N.E. fringe of the Tell.

This study: Numidia, Jijel (!).

Previous records: Aïn Kriar (McLachlan, 1897), Lac des Oiseaux (Samraoui et al., 1992).

Anax imperator Leach, 1815

March-December (V-VII). Widespread but markedly less frequent than *A. parthenope* in the desert.

This study: Numidia, Jijel (!), Collo (!), Negrine (!), El Oued (!), Biskra, El Goléa (!), Sidi Bel Abbas (!), Mostaganem (!), Dréa (!), Ahaggar.

Previous records: Alger, Philippeville, Bône, La Calle (Sély, 1849), Bône (Sély, 1871), between Blida and Médéa (Kolbe, 1885), Médéa, Biskra, Oubeïra (McLachlan, 1897), Biskra, Fetzara, Philippeville (Martin, 1901), La Seybouse (Martin, 1910), Agoulmine Ouroufal (Lacroix, 1925), Fetzana, Hassi Maroket, Arak, G. Ehengas, G. Edjif Mellène, G. Emeghra, O. Igharghar (Dumont, 1978), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

Anax parthenope (Sély, 1839)

April-October (III-V, VIII). Widespread and more abundant in the Sahara. In the Tell, a peak of reproductive activity occurs in September.

This study: Numidia, El Oued (!), Djamaa (!), Touggourt, Ouargla (!), El Goléa (!), Ghardaïa (!), Bousaada (!), Sidi Bel Abbès (!), Béchar (!) Aïn Sefra (!), Ahaggar, Tassili N'Ajjer (!).

Previous records: Edough (Sély, 1866), Touggourt (Sély, 1902), Biskra, Touggourt, Bône (Martin, 1910), Ideles (Le Roi, 1915), Agoulmine Ouroufal (Lacroix, 1925), Bahmer (Reymond, 1952), In Salah, Tagmoute, Arak, G. Imelaouaene, G. Affilal, G. Issakarasène, Temekerest (Dumont, 1978), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

Hemianax ephippiger (Burmeister, 1839)

March-May, July, September-October. A regular migrant that reproduces, sporadically, in the Tell (Samraoui, unpublished).

This study: Numidia, Collo (!).

Previous records: Bône (Sély, 1865), Hassi el Hadjar (Ris, 1913), Temacinin, In Kelemet, Tazzait, O. Agelil, Ideles (Le Roi, 1915), Oran (Lacroix, 1925), In Eker, O. Tamanrasset, O. Tit (Kimmins, 1934), Beni Abbès, Hassi el Meniet (Reymond, 1952), Beni Abbès, Erg Iguidi, Khettamia (Nielsen, 1956), Adrar (Aguesse & Pruja, 1958), Ideles, Beni Abbès (Koch, 1979), El Abiodh Sidi Cheikh, Nukheila, Hassi El Bachir, O. El Gharbi (Dumont, 1988). Hamiz and Kedara dams, Tamanrasset to In Guezzam, Mertoutek, G. El Djenoun, O. Igharghar (Dumont & Desmet, 1990).

Brachytroninae

Boyeria irene (Fonscolombe, 1838)

July-September (VI-VII). Though locally abundant, its crepuscular flying habit makes it hard to record.

This study: Numidia, Mechroha (!), Collo (!).

Previous records: Sebdou, Tlemcen (Morton, 1905), Bône (Martin, 1910), Kabylie (Lacroix, 1925).

GOMPHIDAE

Gomphinae

Gomphus lucasi Sélys, 1849

May-June (V-VII). Final-stadium exuviae can be collected until August (Benchallel, 1994). Fairly abundant and widespread.

This study: Numidia.

Previous records: Rhummel, Oubeïra (Sélys, 1849), between Blida and Médéa (Kolbe, 1885), Constantine (McLachlan, 1897), Rhummel (Martin, 1901), Teniet el Had, Sebdou (Morton, 1905), Constantine, Oubeïra (Martin, 1910).

Onychogomphus costae Sélys, 1885

Emergence, based on exuviae, has been found to occur during May through July (Benchallel, 1994) (VI).

This study: Numidia (!).

Previous records: Oran (Sélys, 1871), Biskra, Constantine (McLachlan, 1897; Martin, 1901, 1910), Bou Faadid, Reggan, Aoulef (Reymond, 1952).

Onychogomphus forcipatus unguiculatus (Vander Linden, 1823)

June (VI-VII). Records, tentatively assigned to this species, comprise one male and larvae, collected at high altitude sites (Djebel Ghora and Edough),.

This study: Numidia (!), Jijel (!).

Previous records: Algeria (Sélys, 1849), between Médéa and Blida (Kolbe, 1885), Constantine (McLachlan, 1897), Sebdou (Morton, 1905), Constantine (Martin, 1910).

Onychogomphus uncatus (Charpentier, 1840)

July (VI). Based on the presence of larvae, it seems fairly abundant in fast flowing streams.

This study: Numidia (!), Mechroha (!).

Previous records: Teniet el Had, Sebdou (Morton, 1905), Rhummel (Martin, 1910), Ighzer Temda (Lacroix, 1925).

Paragomphus genei (Sélys, 1841)

June-October (IV-VI). Abundant both in the desert and in the Tell; emergence peaks in September.

This study: Numidia, Laghouat (!), El Golea (!), Adrar(!), Timimoun(!).

Previous records: Oubeïra, Biskra (McLachlan, 1897).

LIBELLULIDAE

Libellulinae

Orthetrum anceps (Schneider, 1845)

May- October (IV-VI). Abundant and widespread (Tell and Sahara).

This study: Numidia, Mechroha (!), Negrine (!), Bou Saada (!), Biskra, Djamaa (!),

Touggourt, Laghouat, Djelfa (!), Sidi Bel Abbes (!), Oran (!), Tassili N'Ajjer (!).

Previous records: Aïn Kriar, Biskra (McLachlan, 1897), Biskra (Martin, 1901), Biskra, Touggourt, Laghouat (Sély, 1902), Biskra, Hammam R'hira (Morton, 1905), Biskra, La Calle, Constantine, Touggourt (Martin, 1910), Azazga, Tala Kitane, Alger, (Lacroix, 1925), Fetzana (Dumont, 1978), Guerbes (Samraoui & Bélair, 1997).

Orthetrum cancellatum (Linné, 1758)

April-August (V-VII). Our records considerably extend the range across the Tell of this fairly common species.

This study: Numidia, Jijel (!), Batna (!), Laghouat (!), Sidi Bel Abbes (!), Mostaganem (!), Tlemcen (!).

Previous records: Edough (Sély, 1871), La Calle, Oubeïra (McLachlan, 1897), Fetzara (Martin, 1901; 1910), Bône, Fetzara (Ris, 1909), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

Orthetrum chrysostigma chrysostigma (Burmeister, 1839)

April-November. Nowhere abundant but widespread, ranging across the Sahara and the Tell.

This study: Numidia, Collo (!), Jijel (!), Tebessa (!), Negrine (!), El Oued (!), Biskra, El Goléa, Ghardaïa (!), Laghouat (!), Bou Saada (!), Béchar (!), Aïn Sefra (!), Timimoun (!), Mostaganem (!), Ahaggar (!).

Previous records: Tonga (Sély, 1871), Aïn Kriar, Lac des Oiseaux, La Calle, Biskra (McLachlan, 1897), Biskra (Martin, 1901, 1910), Biskra, Ouargla (Sély, 1902), El Goléa (Ris, 1913), Ouargla, Tahiaout, Ideles (Le Roi, 1915), Azazga, Alger, Tala Kitane, Ighzeer Temda (Lacroix, 1925), Beni Abbes, Zaouiet Kounta (Nielsen, 1956), Regganne, Fetzana, Hassi Maroket, In Salah, Tagmoute, Arak, G. Affilal, G. Issakarasène, G. Idjif Mellène, G. Emeghra, O. Igharghar, Temekerest (Dumont, 1978), Beni Abbes (Koch, 1979), Guerbes (Samraoui & Bélair, 1997).

Orthetrum nitidinerve (Sély, 1841)

July-August (IV-VII). This is a species of the semi-arid zone which makes incursions both to the littoral and the Sahara.

This study: Numidia, Mechroha (!), Batna (!), Tebessa (!), Negrine (!), Bou Saada (!), Djelfa (!), Dréa (!), Oran (!), Aïn Sefra (!).

Previous records: Sétif (Sély, 1849), Bône (Sély, 1871), Biskra, Constantine, Aïn Kriar (McLachlan, 1897), Biskra (Martin, 1901), Biskra, Laghouat, Aïn Rich (Sély, 1902), Téniet el Had, Sebdu (Morton, 1905), Sétif, Bône, La Calle, Biskra (Martin, 1910), Bône, Sebdu, Biskra (Ris, 1909), Mascara (Lacroix, 1925).

Orthetrum ransonneti (Brauer, 1865)

August-October (III). Abundant; confined to within and around Central Sahara.

This study: Ahaggar, Tassili N'Ajjer (!).

Previous records: O. Agelil, Ideles (Le Roi, 1915), O. Tamanrasset, O. Tit, Arak (Kimmins, 1934), Arak, Idjif Mellène (Dumont, 1978).

Orthetrum sabina (Drury, 1770)

August-September (VI). Uncommon; it seems to be confined to the Grand Erg Oriental.

This study: El Oued (!), Djamaa (!), Touggourt (!), Ouargla (!).

Previous records: Temacin (Le Roi, 1915).

Orthetrum trinacria (Sélys, 1841)

May-October (V-VIII). Never abundant but widespread. In the Tell, it has never been recorded outside Numidia.

This study: Numidia, El Oued (!), Ouargla (!), El Goléa (!), Timimoun (!), Tassili N'Ajjer (!).

Previous records: Edough (Sélys, 1866), Tonga, Oubeïra, La Calle (McLachlan, 1897), Fetzara (Martin, 1901), Temacin (Sélys, 1902), Fetzara, Tonga, Oubeïra, Lac des Oiseaux, La Seybouse (Martin, 1910), Bône (Ris, 1909), In Salah (Dumont, 1978), Lac des Oiseaux (Samraoui et al., 1992), Lac Noir (Samraoui et al., 1993; Bélair & Samraoui, 1994), Guerbes (Samraoui & Bélair, 1997).

Sympetrinae

Acisoma panorpoides ascalaphoides Rambur, 1842

May-September (VI-VII). Never abundant and confined to a few sites in the N.E. fringe of the Tell.

This study: Numidia, Jijel (!).

Previous records: Oubeïra (Sélys, 1849), Lac des Oiseaux (Samraoui et al., 1992, 1993), Oubeïra, Lac Bleu, Tonga (Samraoui et al., 1993), Lac Noir (Samraoui et al., 1993; Bélair & Samraoui, 1994), Guerbes (Samraoui & Bélair, 1997).

Brachythemis leucosticta (Burmeister, 1839)

May-October (VI-VIII). Locally abundant in Numidia; we have recorded new populations in western Algeria.

This study: Numidia, Sidi Bel Abbes (!), Mostaganem (!).

Previous records: Tonga, Oubeïra, La Calle (Sélys, 1849), Tonga, Oubeïra, Lac des Oiseaux (McLachlan, 1897; Samraoui et al., 1992), Tonga, Oubeïra, Lac des Oiseaux (Martin, 1910), Guerbes (Samraoui & Bélair, 1997).

Crocothemis erythraea (Brullé, 1832)

March-November (III-VI, XII, I). Abundant and widespread.

This study: Numidia, Mechroha, Meskiana (!), Collo, Jijel, Tebessa, Negrine (!), Batna, Bousaada (!), Biskra, Djamaa (!), El Oued (!), Touggourt, Temacin, Ouargla, El Goléa (!), Laghouat (!), Ghardaïa (!), Sidi Bel Abbes (!), Mostaganem (!), Oran (!), Aïn Sefra (!), Tlemcen (!), Bechar (!), Timimoun (!), Adrar (!), Ahagaar, Tassili N'Ajjer (!).

Previous records: La Calle, Tonga, Oubeïra (Sélys, 1849), Bône (Sélys, 1871), Biskra, Bône, La Calle, Tonga (McLachlan, 1897), Biskra, Fetzara, Philippeville (Martin, 1901), Biskra, Touggourt, Ouargla (Sélys, 1902), Biskra (Morton, 1905), Dept. de Constantine, Biskra, Touggourt (Martin, 1910), Bône (Ris, 1911), Ouargla, Temacin, Touggourt (Le Roi, 1915), O. Kerma, Mascara (Lacroix, 1925), Sali, Bou Faadid, Bahmer, Reggan

(Reymond, 1952), Zerhamra, Beni Abbes (Nielsen, 1956), Fetzana, Hassi Maroket, In Salah, Arak, G. Idjif Mellène, G. Emeghra, Temekrest (Dumont, 1978), Beni Abbes (Koch, 1979), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

***Diplacodes lefebvrei* (Rambur, 1842)**

April-November (VI-VII). Locally abundant and confined to N.E. Algeria, this species has, surprisingly, only recently been recorded from nearby Tunisia (Arlt et al., in prep.).

This study: Numidia, Jijel (!).

Previous records: La Calle, Tonga (Sélys, 1849), Lac des Oiseaux (Samraoui et al., 1992; 1993), Oubeïra, Lac Bleu, Tonga (Samraoui et al., 1993), Lac Noir (Samraoui et al., 1993; Bélair & Samraoui, 1994), Guerbes (Samraoui & Bélair, 1997).

***Sympetrum fonscolombei* (Sélys, 1840)**

March-November (VI-IX). Locally abundant; fluctuates widely in numbers. Bivoltine in Numidia, it readily occupies newly created habitats.

This study: Numidia, Jijel (!), Tebessa (!), El Oued (!), Ouargla (!), Ghardaïa (!), Laghouat (!), Ahaggar.

Previous records: Edough (Sélys, 1871), between Blida and Médéa (Kolbe, 1885), Médéa, Biskra (McLachlan, 1897), Sebdo, Tlemcen (Morton, 1905), Biskra (Martin, 1910), Mascara (Navás, 1928), O. Tit (Kimmins, 1934), Aoulef, Hassi el Meniet (Reymond, 1952), Hassi Maroket (Dumont, 1978), El Goléa, Beni Abbes (Koch, 1979), Lac des Oiseaux (Samraoui et al., 1992).

***Sympetrum meridionale* (Sélys, 1841)**

May-November (V-VIII). Abundant and widespread. The pattern of reproduction and ecology of this species is similar to that of *S. striolatum*.

This study: Numidia, Mechroha, Tebessa (!), Jijel.

Previous records: Constantine, La Calle (Sélys, 1849), Edough (Sélys, 1871), Bône, Lac des Oiseaux (McLachlan, 1897), Fetzara, Biskra (Martin, 1901), Teniet el Had, Sebdo, Tlemcen (Morton, 1905), Dept. de Constantine (Martin, 1910), Bône (Ris, 1911), Kabylie (?), Mascara (Lacroix, 1925), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

***Sympetrum sanguineum* (Müller, 1764)**

May-August (V-VII). Never abundant; confined to N.E. Algeria.

This study: Numidia, Jijel (!).

Previous records: Tonga, Oubeïra (Sélys, 1849), Aïn Kriar (MacLachlan, 1897), Dept. de Constantine (Martin, 1910), Kabylie (?) (Lacroix, 1925), Guerbes (Samraoui & Bélair, 1997).

***Sympetrum sinaiticum sinaiticum* (Dumont, 1977)**

August (II-III, VI, IX). Confined to the desert; we have only recorded immature adults near Mount Ilaman (Ahaggar), far from any water body.

This study: Ahaggar.

Previous records: Ouargla, Amgid, O. Agelil, Ideles (Le Roi, 1915), G. Imelaouaene, G. Affilal, G. Issakarassène, G. Edjif Mellène, G. Emeghra (Dumont, 1978).

Sympetrum striolatum (Charpentier, 1840)

All year round; emergence begins in late April and reproductive activity extends throughout autumn and winter (V-X). Abundant and widespread throughout the Tell; its extended flight period is due to a very long prereproductive period (Samraoui et al., 1998).

This study: Numidia, Mechroha, Tebessa (!), Jijel.

Previous records: Tonga (Sély, 1849), Edough (Sély, 1871), Constantine (McLachlan, 1897), Biskra, Fetzara, Philippeville (Martin, 1901), Téniet el Had, Sebdu (Morton, 1905), Dept. de Constantine (Martin, 1910), Bône (Ris, 1911), Tala Kitane, Agoulmine Ouroufal (Lacroix, 1925), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

Trithemistinae

Trithemis annulata (Palisot de Beauvois, 1807)

April-November (III-VII). Never abundant but fairly widespread. It seems, however, to be absent from Central Sahara.

This study: Numidia, Jijel (!), Negrine (!), Biskra (!), Bou Saada (!), Djamaa (!), El Oued (!), Touggourt, Ouargla (!), Laghouat (!), El Goléa (!), Adrar (!), Sidi Bel Abbes (!), Mostaganem (!), Béchar (!), Aïn Sefra (!).

Previous records: Oubeïra (Sély, 1849), Tonga, Oubeïra (McLachlan, 1897), In Salah, Tidikelt (Ris, 1913), Touggourt (Le Roi, 1915), Beni Abbes (Nielsen, 1956; Koch, 1979), Fetzana, Hassi Maroket, Arak (Dumont, 1978), Lac des Oiseaux (Samraoui et al., 1992), Guerbes (Samraoui & Bélair, 1997).

Trithemis arteriosa (Burmeister, 1839)

June-October (IV-VII). Rare in the Tell; abundant in Central Sahara.

This study: Numidia, Ghardaïa (!), Ahaggar, Tassili N'Ajjer (!).

Previous records: Tonga, Oubeïra (Sély, 1849), Ouargla (Sély, 1902; Ris, 1912), Ouargla, Tahihaout, Amguid, Tahart (Le Roi, 1915), Arak (Kimmins, 1934), In Salah, Aïn Tinguelguemine (Reymond, 1952), Fetzana, Hassi Maroket, In Salah, Tagmoute, Arak, Tamanrasset, Tabancourt, G. Ehengas, G. Imelaouaene, G. Affilal, G. Issakarassène, G. Edjif Mellène, G. Emeghra, O. Igharghar, Temkerest (Dumont, 1978), Guerbes (Samraoui & Bélair, 1997).

Trithemis kirbyi ardens Gerstaecker, 1891

July- October. Fairly abundant and widespread in the Sahara.

This study: Bou Saada (!), Laghouat (!), Ghardaïa (!), El Goléa (!), Adrar (!), Timimoun (!), Béchar (!), Aïn Sefra (!), Ahaggar.

Previous records: O. Tit (Kimmins, 1934), Aïn Bou Faadid, Bahmer, Reggan, Aïn Tinguelguemine (Reymond, 1952), Beni Abbes (Nielsen, 1956; Koch, 1979), Reggane, G. Idjif Mellène (Dumont, 1978).

Urothemistinae

Selysiothemis nigra (Vander Linden, 1825)

July-September (V). Locally abundant; it seems to be confined to the eastern part of the Sahara.

This study: Bou Saada (!), Djamaa (!), El Oued (!), Touggourt (!), Temacine (!), Ouargla (!), El Goléa.

Previous records: El Goléa (Ris, 1913), Arak (Dumont, 1978).

Urothemis edwardsi (Sélys, 1849)

May-September (VII). Only a single population remains in Algeria (Samraoui et al., 1993; Bélair & Samraoui, 1994).

This study: Numidia.

Previous records: Oubeïra (Sélys, 1849), Lac Bleu (Samraoui et al., 1993), Lac Noir (Samraoui et al., 1993 ; Bélair & Samraoui, 1994).

Species recorded previously but not found during this study

ZYGOPTERA

CALOPTERYGIDAE

Calopteryx exul Sélys, 1853

Previous records: Boumerzoug (Sélys, 1849), between Blida and Médéa (Kolbe, 1885), Boumerzoug (McLachlan, 1897), Boumerzoug (Martin, 1901), Sebdom (Morton, 1905), Alger, El Guerra, Rhummel (Martin, 1910).

Calopteryx splendens xanthostoma (Charpentier, 1825)

Previous records: Lambessa (Sélys, 1871), El Guerra (Martin, 1910).

Calopteryx virgo meridionalis Sélys, 1853

Previous records: Oran (Sélys, 1849), Constantine (Martin, 1910).

LESTIDAE

Lestinae

Lestes macrostigma (Eversmann, 1836)

Previous records: Algeria (?) (Martin, 1910), Algeria (Aguesse, 1968).

Lestes sponsa (Hansemann, 1823)

Previous records: La Seybouse, Philippeville (Martin, 1910), Tala Kitane (Lacroix, 1925).

Platycnemididae

Platycnemis acutipennis Sélys, 1841

Previous records: Algérie (Brauer, 1876 in Le Roi, 1915).

Platycnemis algira Kolbe, 1885

Previous records: between Blida and Médéa (Kolbe, 1885).

COENAGRIONIDAE

Coenagrioninae

Erythromma najas (Hansemann, 1823)

Previous records: Tonga (Martin, 1910).

Pseudagrion hamoni Fraser, 1955

Previous records: Tassili N'Ajjer (Dumont, pers. comm.).

Ischnurinae

Enallagma cyathigerum (Charpentier, 1840)

Previous records: Constantine (McLachlan, 1897), Lac des Oiseaux (Samraoui et al., 1992 but see under Synonyms below).

Ischnura genei (Rambur, 1842)

Previous records: Hoggar, Ouargla, Touggourt (Le Roi, 1915), O. Tit, Arak (Kimmins, 1934).

Ischnura lamellata Kolbe, 1885

Previous records: between Blida and Médéa (Kolbe, 1885).

Ischnura senegalensis Rambur, 1958

Previous records: Algeria (Aguesse, 1968).

ANISOPTERA

GOMPHIDAE

Gomphinae

Gomphus similimus maroccanus Lieftinck, 1966

Previous records: Algérie (Brauer, 1876 in Le Roi, 1915), El Guerra, La Seybouse (Martin, 1910).

Onychogomphus hagenii (Sélys, 1871)

Previous records: Biskra (Martin, 1901, 1910; Ris, 1913), Oubeïra (Martin, 1910).

Onychogomphus lefebvrei (Rambur, 1842)

Previous records: Rhummel (?), Biskra (?) (Martin, 1910).

Lindeniinae*Lindenia tetraphylla* (Vander Linden, 1825)

Previous records: La Calle (Sélys, 1849).

CORDULEGASTRIDAE

Cordulegaster boltoni algira Morton, 1916

Previous records: Sebdou, Tlemcen (Morton, 1905), Constantine, La Calle, Lac des Oiseaux (Martin, 1910).

CORDULIIDAE

Cordulia aenea (Linné, 1758)

Previous records: Oran (Sélys, 1871), Lac des Oiseaux (Martin, 1910).

LIBELLULIDAE

Libellulinae*Orthetrum brunneum brunneum* (Fonscolombe, 1837)

Previous records: Bou Tlelis, Sebdou (Ris, 1909), Mascara (Navás, 1922).

Orthetrum coerulescens (Fabricius, 1798)

Previous records: Oubeïra (Sélys, 1849), Bône, Philippeville, Sétif, La Calle (Martin, 1910).

Orthetrum taeniolatum (Schneider, 1845)

Previous records: Beni Abbes, Ougarta, Zeramra, Bahmer, Bou Ali, Bou Faadid, Reggan, Aoulef, In Salah, Aïn Tinguelguemine (Reymond, 1952).

Sympetrinae*Sympetrum depressiusculum* (Sélys, 1841)

Previous records: Tonga (Martin, 1910).

Trameinae

Pantala flavescens (Fabricius, 1798)

Previous records: O. Tamanrasset (Kimmins, 1934).

This circumtropical species has recently been recorded in Morocco (Jödicke, 1995).

Rhyothemis semihyalina (Desjardin, 1832)

Previous records: Oubeïra (Sélys, 1849).

Zygonichinae

Zygonyx torridus (Kirby, 1889)

Previous records: Algeria (Aguesse, 1968).

This species is confined to a single locality in Morocco (Dumont, 1972).

Discussion

We have listed 79 species of dragonflies which have been recorded in Algeria since 1849. During our own survey, we recorded 53 species, including one taxon (*Lestes* cf. *virens*) tentatively new to the Algerian fauna. The 26 species that have been recorded previously but not during our survey can be divided into four categories:

Genuine records. *Calopteryx exul*, *C. splendens*, *C. virgo meridionale*, *Pseudagrion hamoni*, *Lindenia tetraphylla*, *Cordulegaster boltoni*, *Cordulia aenea*, *Orthetrum brunneum*, *Pantala flavescens* and *Rhyothemis semihyalina*.

With the exception of *P. hamoni* (found in the Tassili N'Ajjer) and *P. flavescens*, a well known circumtropical migrant, all of the species were already rare in the 19th Century. For lotic species, habitat degradation is an aggravating factor and unfortunately the unsettled political situation in the country has not allowed us thoroughly to explore hilly sites where several of these species might still occur. *Lindenia tetraphylla* and *Rhyothemis semihyalina* can safely be considered to be locally extinct.

Synonyms. *Platycnemis acutipennis* (*P. subdilatata*), *P. algira* (*P. subdilatata*), *Enallagma cyathigerum* (status unclear in Algeria, pending genetical analysis; possibly confused with *E. deserti*), *Ischnura genei* (*I. saharensis*), *Onychogomphus hageni* (*Paragomphus genei*) and *O. lefebvrei* (status unclear in Algeria, possibly confused with *O. forcipatus*).

Doubtful records that require confirmation. *Lestes sponsa*, *Erythromma najas*, *Gomphus simillimus*, *Orthetrum coerulescens* and *Sympetrum depressiusculum*.

Four of these species can be traced to Martin's (1910) paper. It would be very helpful to check Martin's collection, though labelling errors are always possible. Only *Erythromma viridulum* (with local specimens matching the European *E. najas*

in size) maintains a population in Lake Tonga whereas *Gomphus lucasi* might have been confused with *G. simillimus*. Thus, the co-occurrence in Algeria of *G. lucasi* and *G. simillimus maroccanus* can safely be ruled out (Jacquemin, 1991).

Mistaken records. *Lestes macrostigma*, *Ischnura lamellata* (*I. elegans*!), *I. senegalensis*, *Orthetrum taeniolatum* and *Zygonyx torridus*.

Dumont (1977) has already criticized Aguesse's speculative North African check-list. Three species (*L. macrostigma*, *I. senegalensis* and *Zygonyx torridus*) seem to be concerned (Aguesse, 1968). *Orthetrum taeniolatum* is a most probable misidentification by Fraser (Reymond, 1952) of *O. chrysostigma*, an abundant species along the O. Saoura. Another mistaken record is that of *I. elegans* (Askew, 1988).

Distribution

The dragonfly fauna of Algeria, comprising 63 species, compares favourably with the total of 55 species from neighbouring Morocco (Lieftinck, 1966; Dumont, 1972; Jacquemin, 1984, 1994; Jödicke, 1995) and 49 species from Tunisia (Dumont, 1977; Arlt et al., in prep.). The fauna of Tunisia has recently been updated (Arlt et al., in prep.) and it is worthwhile recalling that the Tunisian check-list shares with its Algerian counterpart some of the unconfirmed species: *L. sponsa*, *E. najas*, *Gomphus simillimus maroccanus* and *O. lefebvrei*. Other species (*Calopteryx splendens xanthostoma*, *Cordulegaster boltoni algericus*, *Acisoma panorpoides ascalaphoides*, *Rhyothemis semihyalina* and *Selysiothemis nigra*) have been recorded close to the Tunisian border but have yet to be discovered within that country, whereas others (*Enallagma deserti*, *Orthetrum sabina*, *O. trinacria*, *Diplacodes lefebvrei* and *Urothemis edwardsi*) have recently been found (Arlt et al., in prep.). The record of *Urothemis edwardsi* is particularly surprising and deserves confirmation. In contrast to the Tunisian odonate fauna, which is similar to the Algerian one, many of the Moroccan dragonflies (*Lestes dryas*, *Pyrrhosoma n. nymphula*, *Gomphus simillimus maroccanus*, *Gomphus graslinii*, *Oxygastra curtisi*, *Macromia splendens*, *Cordulegaster princeps*, *Libellula quadrimaculata quadrimaculata* and *Zygonyx torridus*) have not so far been recorded within Algeria. A careful search in western Algeria is needed before conclusions can be drawn.

Out of a total of 63 species (which takes into account only genuine records), 11 are widespread, having a range spanning both the Sahara and the Tell. About half of this group, which does not include a single zygopteran, is made up of Afrotropical species (*Paragomphus genei*, *Orthetrum chrysostigma chrysostigma*, *O. trinacria*, *Trithemis annulata* and *T. arteriosa*).

Saharan species, limited to 8 species, are mainly composed of mesasiatic species (*Ischnura fountaineae*, *Orthetrum ranssoneti*, *O. sabina*, *Sympetrum sinaiticum sinaiticum* and *Selysiothemis nigra*). Both the Afrotropical *Ischnura saharensis* and *Trithemis kirbyi ardens*, though widespread in the Sahara, do not extend into the Tell. However, it is worth noting that in Morocco the former species has been found in the Rif (Jacquemin, 1984).

Species of semi-arid habitats comprise *Coenagrion caerulescens*, *Enallagma deserti* and *Orthetrum nitidinode*. These three species can be found, at times, within the desert (Dumont, 1978) or the coastal wetlands (Samraoui, in prep.).

Finally, with the exception of *Pantala flavescens*, a circumtropical tropical migrant, the rest of the Algerian dragonflies (55 species) are to be found in the Tell, many species being further restricted in their range to Numidia in N.E. Algeria (Samraoui, in prep.). This latter region accounts for over 80% of the recorded dragonfly fauna of Algeria.

One interesting fact is the absence of Afrotropical zygopteran relics in the Tell and northern Sahara. Two distinct species have reached Algeria and Morocco: *Pseudagrion hamoni* is confined to the Tassili N'Ajjer (Dumont, pers. comm.) and one relict population of *Pseudagrion sublacteum* is restricted to O. Sebou (Jacquemin & Aguesse, 1987).

Conservation

The dragonflies of Algeria may appear to have been well preserved, but a worrying trend is detectable. Indeed, the rate of habitat degradation (caused by pollution and draining) has accelerated during the last twenty years, and lotic species have been particularly vulnerable as stream pollution has become widespread in the country. It cannot be mere coincidence that four lotic species (*Calopteryx exul*, *C. splendens*, *C. virgo* and *Cordulegaster boltoni*) have not been recorded by us. All previous localities of *C. exul* have been visited, with disappointing results: extensively polluted habitats precluded all dragonfly life. Several populations of *C. exul* and *C. virgo* exist in Morocco and it is expected that more efforts would uncover new localities within Algeria. However, urgent, vigorous and effective conservation measures are needed to save local habitats and their inhabitants.

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